
**Metallic materials — Method of test for
the determination of quasistatic fracture
toughness of welds**

*Matériaux métalliques — Méthode d'essai pour la détermination de la
ténacité quasi statique à la rupture des soudures*



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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Metallic materials — Method of test for the determination of quasistatic fracture toughness of welds

1 Scope

This International Standard specifies methods for determining fracture toughness in terms of K (stress intensity factor), δ (crack tip opening displacement, CTOD) and J (experimental equivalent of the J -integral) for welds in metallic materials.

This International Standard is complementary to ISO 12135, which covers all aspects of fracture toughness testing of parent metal and which needs to be used in conjunction with this document. This International Standard describes methods for determining point values of fracture toughness. It should not be considered a way of obtaining a valid R -curve (resistance-to-crack-extension curve). However, the specimen preparation methods described in this International Standard could be usefully employed when determining R -curves for welds. The methods use fatigue precracked specimens which have been notched, after welding, in a specific target area in the weld. Methods are described to evaluate the suitability of a weld for notch placement within the target area, which is either within the weld metal or within the weld heat-affected zone (HAZ), and then, where appropriate, to evaluate the effectiveness of the fatigue crack in sampling these areas.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3785, *Metallic materials — Designation of test specimen axes in relation to product texture*

ISO 12135, *Metallic materials — Unified method of test for the determination of quasistatic fracture toughness*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12135 and the following apply.

3.1

stretch zone width

SZW

increase in crack length associated with crack tip blunting — i.e. prior to the onset of unstable crack extension, pop-in (see 3.3) or slow stable crack extension — and occurring in the same plane as the fatigue precrack

3.2

target area

intended fatigue crack tip position within the weld metal or HAZ

NOTE See 3.7 and 3.9.